

AMENDMENT UNDER 37 C.F.R. 1.114

Serial Number: 09/672,954

Filing Date: September 29, 2000

Title: EFFICIENT DETECTION OF TEXTURE SHARING BETWEEN MULTIPLE CONTEXTS

Assignee: Intel Corporation

Page 2

Dkt: 884.895US1 (INTEL)

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A computer-implemented method comprising:

obtaining a texture usage mask of a subject texture;

obtaining an inverted context ID of a subject context;

ANDing the texture usage mask of the subject texture with the inverted context ID of the subject context to produce a resultant value;

detecting that the subject texture is not being shared by another context with the subject context upon the resultant value being equal to 0 and detecting that the subject texture is being shared by another context with the subject context upon the resultant value not being equal to 0; and

revising the texture usage mask of a subject texture prior to the subject texture being used by another context by bitwise ORing the texture usage mask with a context ID of the another context to produce a resultant new texture usage mask for the subject texture.

2. (Canceled)

3. (Currently Amended) The computer-implemented method of claim 1, further comprising:

revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by deleting a context ID of the particular context from the texture usage mask to produce a resultant new texture usage mask for the subject texture.

4. (Currently Amended) ~~The method of claim 1, further comprising:~~

~~revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by deleting a context ID of the particular context from the texture usage mask to produce a resultant new texture usage mask for the subject texture. The~~

AMENDMENT UNDER 37 C.F.R. 1.114

Serial Number: 09/672,954

Filing Date: September 29, 2000

Title: EFFICIENT DETECTION OF TEXTURE SHARING BETWEEN MULTIPLE CONTEXTS

Assignee: Intel Corporation

Page 3

Dkt: 884.895US1 (INTEL)

computer-implemented method of claim 1, wherein the inverted context ID of the subject context is a single bit in an integer word.

5. (Currently Amended) A computer-implemented method comprising:
- obtaining a texture usage mask of a subject texture;
 - obtaining a context ID of a subject context;
 - performing a first logic operation with the texture usage mask of the subject texture and the context ID of the subject context to produce a resultant value;
 - detecting that the subject texture is not being shared by another context with the subject context upon the resultant value being equal to a first predetermined value and detecting that the subject texture is being shared by another context upon the resultant value being equal to a second predetermined value which is different from the first predetermined value; and
 - revising the texture usage mask of a subject texture prior to the subject texture being used by another context by performing a second logic operation with the texture usage mask and a context ID of the another context to produce a resultant new texture usage mask for the subject texture.

6. (Canceled)

7. (Currently Amended) The computer-implemented method of claim 5, further comprising:

revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by performing a third logic operation with the texture usage mask and a context ID of the particular context to produce a resultant new texture usage mask for the subject texture.

8. (Currently Amended) ~~The method of claim 7, further comprising:~~

~~revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by performing a third logic operation with the texture usage mask and a context ID of the particular context to produce a resultant new texture usage mask for~~

AMENDMENT UNDER 37 C.F.R. 1.114

Serial Number: 09/672,954

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Title: EFFICIENT DETECTION OF TEXTURE SHARING BETWEEN MULTIPLE CONTEXTS

Assignee: Intel Corporation

Page 4

Dkt: 884.895US1 (INTEL)

~~the subject texture.~~ The computer-implemented method of claim 5, wherein the texture usage mask tracks identifiers of contexts using the subject texture.

9. (Previously Presented) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method comprising:

obtaining a texture usage mask of a subject texture;

obtaining an inverted context ID of a subject context;

ANDing the texture usage mask of the subject texture with the inverted context ID of the subject context to produce a resultant value;

detecting that the subject texture is not being shared by another context with the subject context upon the resultant value being equal to 0 and detecting that the subject texture is being shared by another context with the subject context upon the resultant value not being equal to 0; and

revising the texture usage mask of a subject texture prior to the subject texture being used by another context by bitwise ORing the texture usage mask with a context ID of the another context to produce a resultant new texture usage mask for the subject texture.

10. (Canceled)

11. (Original) The program storage device of claim 9, the method further comprising:

revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by deleting a context ID of the particular context from the texture usage mask to produce a resultant new texture usage mask for the subject texture.

12. (Currently Amended) ~~The program storage device of claim 11, the method further comprising:~~

~~revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by deleting a context ID of the particular context from the texture usage mask to produce a resultant new texture usage mask for the subject texture.~~

AMENDMENT UNDER 37 C.F.R. 1.114

Serial Number: 09/672,954

Filing Date: September 29, 2000

Title: EFFICIENT DETECTION OF TEXTURE SHARING BETWEEN MULTIPLE CONTEXTS

Assignee: Intel Corporation

Page 5

Dkt: 884.895US1 (INTEL)

The program storage device of claim 9, wherein if only one bit of the texture usage mask is turned on, then only one context is using the subject texture.

13. (Previously Presented) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method comprising:

obtaining a texture usage mask of a subject texture;

obtaining a context ID of a subject context;

performing a first logic operation with the texture usage mask of the subject texture and the context ID of the subject context to produce a resultant value;

detecting that the subject texture is not being shared by another context with the subject context upon the resultant value being equal to a first predetermined value and detecting that the subject texture is being shared by another context upon the resultant value being equal to a second predetermined value which is different from the first predetermined value; and

revising the texture usage mask of a subject texture prior to the subject texture being used by another context by performing a second logic operation with the texture usage mask and a context ID of the another context to produce a resultant new texture usage mask for the subject texture.

14. (Canceled)

15. (Original) The program storage device of claim 13, the method further comprising:

revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by performing a third logic operation with the texture usage mask and a context ID of the particular context to produce a resultant new texture usage mask for the subject texture.

AMENDMENT UNDER 37 C.F.R. 1.114

Serial Number: 09/672,954

Filing Date: September 29, 2000

Title: EFFICIENT DETECTION OF TEXTURE SHARING BETWEEN MULTIPLE CONTEXTS

Assignee: Intel Corporation

Page 6

Dkt: 884.895USI (INTEL)

16. (Currently Amended) ~~The program storage device of claim 15, the method further comprising:~~

~~revising the texture usage mask of a subject texture upon the subject texture no longer being used by a particular context by performing a third logic operation with the texture usage mask and a context ID of the particular context to produce a resultant new texture usage mask for the subject texture. The program storage device of claim 13, wherein the texture usage mask tracks identifiers of contexts using the subject texture.~~

17. (Previously Presented) A computer-implemented method comprising:

retrieving a texture usage mask of a texture;

retrieving an inverted context ID of a context;

performing a first type of logical operation of the texture usage mask of the texture with the inverted context ID of the context;

detecting whether the texture is being shared by another context with the context based on the first type of logical operation;

performing a clear operation, an attach operation and a set operation when one of a number of texture units associated with a context completes the processing of a texture, wherein the clear operation includes clearing the identification of the context in the texture usage mask associated with the texture, the attach operation to include attaching a different texture to the one of the number of texture units that completed the processing of the texture and wherein the set operation includes setting the identification of the context in the texture usage mask for the textures being processed by the number of texture units in the context; and

and paging out a texture from a texture memory based on a type of logical operation of the identification of the contexts processing the texture and the texture usage mask of the texture, wherein the type of logical operation is the same as the first type of logical operation.

18. (Canceled)

19. (Currently Amended) A computer system comprising:

a number of texture units to process a number of subject textures, wherein a texture unit of the number of texture units is associated with one of a number of contexts;

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Assignee: Intel Corporation

Page 7

Dkt: 884.895US1 (INTEL)

a texture memory to store at least one of the number of subject textures;
a system memory to store at least one of the number of subject textures;
a processor to execute instructions that include the following operations when one of the number of texture units for a context completes the processing of a texture,
clear the identification of the context in the texture usage mask associated with the subject texture;
attach a different subject texture to the one of the number of texture units that completed the processing of the texture;
set the identification of the context in the texture usage mask for the subject textures being processed by the number of texture units in the context; and
a texture manager to page out a texture from the texture memory to the system memory based on a logical operation of an identification of the contexts to process the texture and the texture usage mask of the texture.

20. (Canceled)

21. (Currently Amended) The computer system of claim 19, wherein the logical operation is an AND operation.

Claims 22-24. (Canceled)

25. (Currently Amended) The computer-implemented method of claim 17, wherein the first type of logical operation is an "AND" operation.

26. (Currently Amended) The computer-implemented method of claim 17, wherein the inverted context ID is a single bit in an integer word.

27. (Currently Amended) The computer-implemented method of claim 19, wherein the identification of a context is represented in a single bit in an integer word.